

Serial No. 10/801,478  
Page 2 of 15

### **IN THE CLAIMS**

1. (original) A position measuring apparatus, comprising:

a receiver for receiving signals from a plurality of satellites and measuring a position of a mobile station based on the received signals;

an angle determination unit for determining angle range depending on positional relation between the measured position of the mobile station and an obstacle;

an orbit information extraction unit for extracting orbit information indicating orbits of the satellites from the received signals;

a measurement unit for measuring quality of the signals from at least one of the satellites that is expected to exist within the angle range based on the extracted orbit information; and

a correction unit for correcting the measured position of the mobile station to another position having a different height, according to the measured quality of the signal from the at least one of the satellites.

2. (original) The position measuring apparatus as claimed in claim 1, further comprising:

a display for displaying positions of the mobile station and the obstacle on a screen.

3. (original) The position measuring apparatus as claimed in claim 1, wherein the correction unit corrects whether the mobile station is on a roof of a building or on a road at the periphery of the building.

84138320\_1

Serial No. 10/801,478

Page 3 of 15

4. (original) The position measuring apparatus as claimed in claim 3, wherein the correction unit determines that the mobile station is on the roof of the building, when strength of the signal from the at least one of the satellites exceeds a predetermined value.

5. (original) The position measuring apparatus as claimed in claim 3, wherein the correction unit determines that the mobile station is on the road at the periphery of the building, when strength of the signal from the at least one of the satellites is less than a predetermined value.

6. (currently amended) A position measuring apparatus mounted in a fixed reference station, for estimating a position of a mobile station moving in an area in communication with the fixed reference station, comprising:

a memory for storing position information relating to an obstacle;

a receiver for receiving position information of the mobile station that has been measured by the mobile station based on signals from a plurality of GPS satellites, and for receiving mobile station satellite information indicating at least one of the satellites from which the mobile station has received a signal;

a collator for collating reference station satellite information indicating at least one of the satellites from which the reference station has received a signal, with the mobile station satellite information, wherein a result of the collation indicates a reliable measured position if said satellites from which the mobile station received a signal are the same as said satellites from which the reference station received a signal, and an unreliable measured position if said

84138320\_1

Serial No. 10/801,478

Page 4 of 15

satellites from which the mobile station received a signal are not the same as said satellites from which the reference station received a signal; and

a correction unit for correcting the measured position of the mobile station based on [[a]] the result of the collation and coordinates of the obstacle.

7. (original) The position measuring apparatus as claimed in claim 6, further comprising:  
a display for displaying positions of the mobile station and the obstacle on a screen.

8. (original) The position measuring apparatus as claimed in claim 6, wherein the mobile station satellite information indicates one of the satellites from which the mobile station has received a signal higher than a predetermined quality.

9. (currently amended) The A position measuring apparatus as claimed in claim 6, mounted in a fixed reference station, for estimating a position of a mobile station moving in an area in communication with the fixed reference station, comprising:

a memory for storing position information relating to an obstacle;

a receiver for receiving position information of the mobile station that has been measured by the mobile station based on signals from a plurality of GPS satellites, and for receiving mobile station satellite information indicating at least one of the satellites from which the mobile station has received a signal;

a collator for collating reference station satellite information indicating at least one of the satellites from which the reference station has received a signal, with the mobile station satellite information; and

84138320\_1

Serial No. 10/801,478

Page 5 of 15

a correction unit for correcting the measured position of the mobile station based on a result of the collation and coordinates of the obstacle,

wherein the correction unit corrects whether the mobile station is on a roof of a building as the obstacle or on a road at the periphery of the building.

10. (original) The position measuring apparatus as claimed in claim 9, wherein the correction unit determines that the mobile station is on the roof of the building, when the mobile station satellite information matches the reference station satellite information.

11. (original) The position measuring apparatus as claimed in claim 9, wherein the correction unit determines that the mobile station is on the road at the periphery of the building, when the mobile station satellite information does not match the reference station satellite information.

12. (currently amended) A position measuring apparatus provided in a mobile station, for estimating a position of the mobile station moving in an area in communication with a fixed reference station, comprising:

a memory for storing position information relating to ~~a building~~ an obstacle;

a position measuring unit for measuring a position of the mobile station, based on signals from a plurality of GPS satellites;

a receiver for receiving reference station satellite information indicating at least one of the satellites from which the reference station has received a signal;

84138320\_1

Serial No. 10/801,478

Page 6 of 15

a collator for collating mobile station satellite information indicating the at least one of the satellites from which the mobile station has received a signal, with the reference station satellite information, wherein a result of the collation indicates a reliable measured position if said satellites from which the mobile station received a signal are the same as said satellites from which the reference station received a signal, and an unreliable measured position if said satellites from which the mobile station received a signal are not the same as said satellites from which the reference station received a signal; and

a correction unit for correcting the measured position of the mobile station based on [[a]] the result of the collation and coordinates of the building obstacle.

13. (currently amended) The position measuring apparatus as claimed in claim 12, further comprising:

a display for displaying positions of the mobile station and the building obstacle on a screen.

14. (original) The position measuring apparatus as claimed in claim 12, wherein the mobile station satellite information indicates one of the satellites from which the mobile station has received a signal higher than a predetermined quality.

15. (currently amended) ~~The A position measuring apparatus as claimed in claim 12,~~ provided in a mobile station, for estimating a position of the mobile station moving in an area in communication with a fixed reference station, comprising:

a memory for storing position information relating to a building;

84138320\_1

Serial No. 10/801,478

Page 7 of 15

a position measuring unit for measuring a position of the mobile station, based on signals from a plurality of GPS satellites;

a receiver for receiving reference station satellite information indicating at least one of the satellites from which the reference station has received a signal;

a collator for collating mobile station satellite information indicating the at least one of the satellites from which the mobile station has received a signal, with the reference station satellite information; and

a correction unit for correcting the measured position of the mobile station based on a result of the collation and coordinates of the building.

wherein the correction unit corrects whether the mobile station is on a roof of the building or on a road at the periphery of the building.

16. (original) The position measuring apparatus as claimed in claim 15, wherein the correction unit determines that the mobile station is on the roof of the building, when the mobile station satellite information matches the reference station satellite information.

17. (original) The position measuring apparatus as claimed in claim 15, wherein the correction unit determines that the mobile station is on the road at the periphery of the building, when the mobile station satellite information does not match the reference station satellite information.

84138320\_1

Serial No. 10/801,478

Page 8 of 15

18. (currently amended) A position measuring apparatus for measuring a position of the apparatus using signals received from a plurality of satellites, comprising obstacle reflecting means containing obstacle information, characterized in that

if the apparatus cannot receive a signal from one of the satellites or quality of a received signal is lower than a predetermined value, the apparatus determines that the apparatus is not positioned in an area where there is no obstacle between the satellite and the apparatus, or determines that reliability for the measured position of the apparatus is lower than that in a case where the apparatus is positioned in said area,

the position measuring apparatus further characterized in that if the reliability is determined as lower, then coordinates of the measured position are corrected to a corrected position closer or within said area.

19. (original) A position measuring apparatus for measuring a position of the apparatus using signals received from a plurality of satellites, comprising a correction unit, characterized in that

if there is an obstacle between the measured position of the apparatus and a satellite, and a signal from the satellite can be received or its quality is higher than a predetermined value, then the correction unit corrects the measured position of the apparatus to an area where there is no obstacle between the satellite and the apparatus.

20. (original) A position measuring apparatus for measuring a position of the apparatus using signals received from a plurality of satellites, comprising a correction unit, characterized in that

84138320\_1

Serial No. 10/801,478

Page 9 of 15

if there is no obstacle between the measured position of the apparatus and a satellite and a signal from the satellite cannot be received or its quality is lower than a predetermined value, then the correction unit corrects the measured position of the apparatus to an area where there is an obstacle between the satellite and the apparatus.

21. (original) The position measuring apparatus as claimed in claim 20, wherein the correction unit corrects the measured position of the apparatus by an amount less than a predetermined value.

22. (original) A position calculating apparatus for measuring a position of the apparatus based on information obtained from a GPS receiver, comprising obstacle reflecting means containing obstacle information, characterized in that

if the obstacle reflecting means obtains the fact from the GPS receiver that a signal from a satellite cannot be received or its quality is lower than a predetermined value, and there is no obstacle between the satellite and the measured position, then the obstacle reflecting means determines that the apparatus is not at the measured position or determines that reliability for the measured position is lower than that in a case where there is an obstacle between the satellite and the measured position.

23. (new) The position measuring apparatus as claimed in claim 6, wherein the mobile station satellite information includes ID information of the satellites from which the mobile station received a signal, and the reference station satellite information includes ID information of the satellites from which the reference station received a signal, and wherein whether the

84138320\_1



Serial No. 10/801,478

Page 10 of 15

satellites from which the mobile station received a signal are the same as the satellites from which the reference station received a signal is based on whether the ID information of said satellites is the same.

24. (new) The position measuring apparatus as claimed in claim 12, wherein the mobile station satellite information includes ID information of the satellites from which the mobile station received a signal, and the reference station satellite information includes ID information of the satellites from which the reference station received a signal, and wherein whether the satellites from which the mobile station received a signal are the same as the satellites from which the reference station received a signal is based on whether the ID information of said satellites is the same.

84138320\_1